

BCM-W100 User's Manual



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1. INTRODUCTION

1.1 DESCRIPTION

Blue-Comm 的 W100 嵌入式設備連網伺服器是特別為了串列設備能夠簡易的快速連上雲端而設計。

應用於實際產品時，可以選擇 AT Command Mode 或 MODBUS Gateway Mode, 不管那種模式都只要簡易幾個步驟就可以輕易的讓原有的串列產品連上網路。藉助 Cortex-M3 系統晶片的強大運算力量，W100 支援 IEEE 802.11 b/g/n、高達 230400 Kbps 的串列傳輸率、多樣化且立即可用的標準操作模式，並且只需要少量的電源。

這樣的方案能幫助客戶縮短開發時間，節省板子空間，容易認證，而且不需要太多的 RF 經驗。

利用 Blue-Comm 研究團隊創新技術，W100 可用於將任何具有標準串列介面的設備即時轉換為具備無線網路功能。



- * AT Command Mode Supported
- * MODBUS Gateway Mode Supported



1.2 FORM FACTOR

Type: Pin header module

Dimensions: 32.5 x 25 x 5 mm

Weight: 8 g

1.3 SYSTEM INFORMATION

- **MCU** **STM32 ARM 32-bit Cortex™-M3 Frequency up to 120 MHz**
- **Diverse serial interface** **USART**
- **Sensor applications support** **ADC, I2C, I2S, GPIO, CAN bus, 8-bit parallel**
- **On-chip functionality** **Single-chip MAC/BB/RF**
- **Frequency Band** **2.4 GHz**
- **Transmit Power** **+17 dBm @b mode/11 Mbps**
- **MIN Receiver Sensitivity** **-96 dBm**
- **Network Standard** **802.11b, 802.11g, 802.11n (single stream)**
- **Modulation Modes** **CCK and OFDM with BPSK, QPSK, 16 QAM, 64QAM**
- **Hardware Encryption** **WEP, WPA/WPA2**
- **Supported Data Rates**
 - IEEE 802.11b 1 – 11 Mbps**
 - IEEE 802.11g 6 – 54 Mbps**
 - IEEE 802.11n (2.4 GHz) 7.2 – 72.2 Mbps**
- **Operating Temperature** **-40°C to 85°C**
- **MSL level 3**
- **Certification** **FCC and CE compliant**





1.4 SERIAL INTERFACE

Number of Ports: 1

Transmission Format: Standard TTL

1.5 SERIAL COMMUNICATION PARAMETERS

Data Bits: 8

Stop Bits: 1

Parity: None /Even /Odd

Flow Control: None

Baud rate: 2400 /4800 /9600 /19200 /38400 /57600/ 115200 /230400 Kbps

1.6 SERIAL SIGNALS

TTL: TXD, RXD, GND

TTL: RS485 direction control

1.7 DIGITAL I/O PINS

GPIO: 32 configurable I/O pins

UART *3 /SPI *1 /I2C *1 /ADC *5 /CAN *1 /GPIO

1.8 SOFTWARE

Network Protocols: ICMP, ARP, IP, TCP, UDP, DHCP, HTTP, SNMP V1, SMTP, TFTP

Configuration Options: Web Console, Device Search Windows AP

Work Mode: AT Command supported /MODBUS Gateway supported

Upgrade : Firmware /Web upgrade over Ethernet

Communication Protocol: AT Command Set Supported



1.9 ENVIRONMENTAL LIMITS

Operating Temperature:

Standard Models: 0 to 55°C (32 to 131°F)

Wide Temp. Models: -40 to 85°C (-40 to 185°F)

Storage Temperature (package included): -40 to 60°C (-40 to 140°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

1.10 POWER REQUIREMENTS

Input Voltage: 3.3 VDC ($\pm 5\%$)

Power Consumption: 50 mA @ 3.3 VDC input max.

1.11 WARRANTY

Warranty Period: 1 years

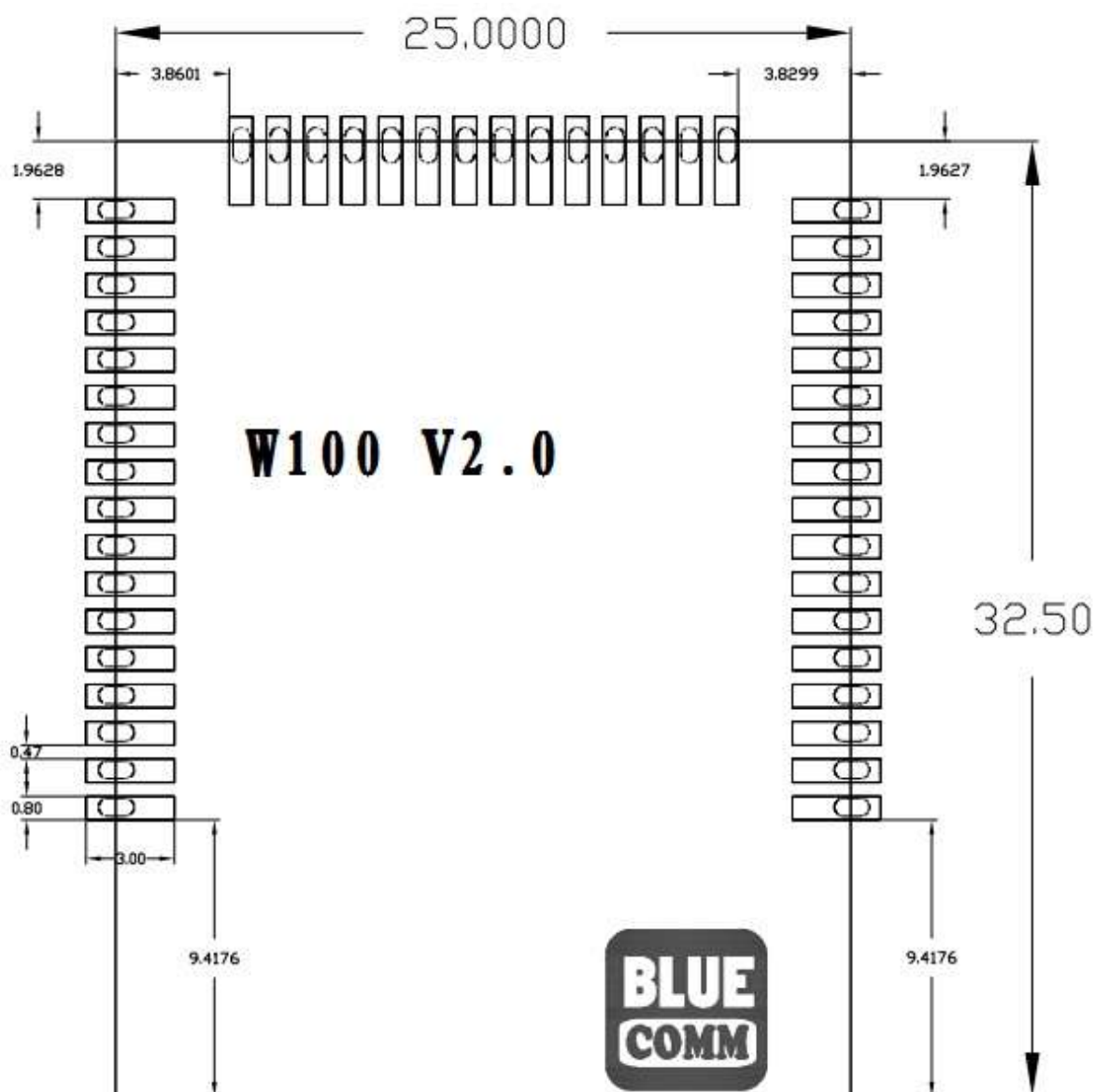
Details: See www.blue-comm.com.tw

1.12 WHERE TO USE W100



1.13 DIMENSION

Unit: mm



**1.14 PIN ASSIGNMENT-1**

Main Pins (20 Pins)		
Pin	Signal Name	Function
1	GND	GND
2	PH8	Reset to Default
3	PH9	GPIO
4	PH10	GPIO
5	PH11	GPIO
6	PH12	GPIO
7	PH14	GPIO
8	UART1-TX /PA9	Communication Port TX
9	UART1-RX /PA10	Communication Port RX
10	32K Clock IN	System Reserve
11	UART2-TX /PD5	System Reserve
12	UART2-RX /PD6	System Reserve
13	SPI1-MOSI /PA7	SPI1 /GPIO
14	SPI1-MISO /PA6	SPI1 /GPIO
15	SPI1-CLK /PA5	SPI1 /GPIO
16	PA4	GPIO



17	PA_PWR	Power (+3.3Vdc)
18	PB14	GPIO
19	PB15	GPIO
20	PB10	GPIO
21	GPIO-1	System Reserve
22	GPIO-2	System Reserve
23	GND	GND
24	VCC	Power (+3.3Vdc)
25	TMS	System Reserve
26	TCK	System Reserve
27	NC0	System Reserve
28	TDI	System Reserve
29	TDO	System Reserve
30	TRSTN	System Reserve
31	#RESET	Reset
32	PH15	GPIO
33	PH13	GPIO
34	NC1	System Reserve
35	NC2	System Reserve

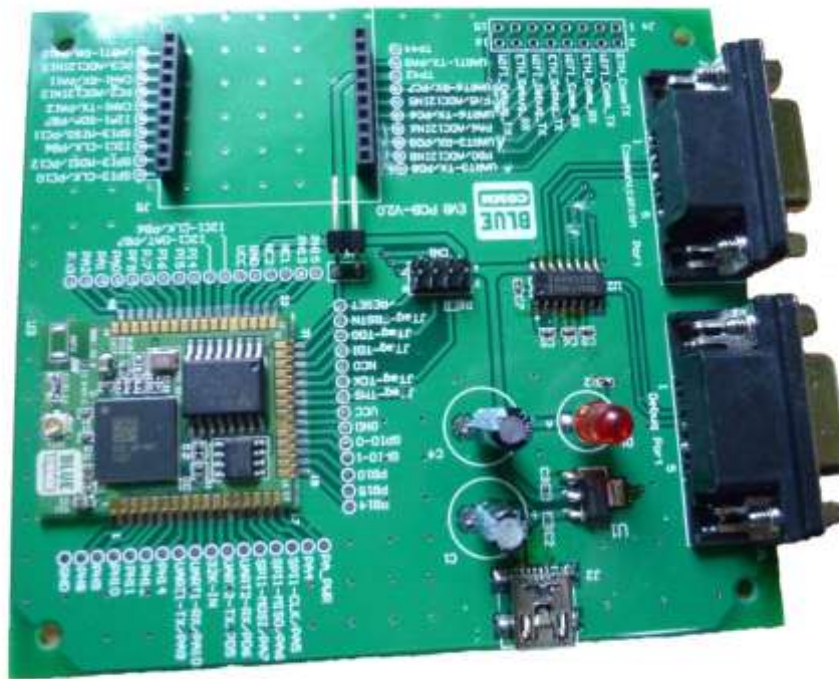


36	GND	GND
37	VCC	Power (+3.3Vdc)
38	I2C1-CLK /PB6	I2C1 /GPIO
39	I2C1-DAT /PB7	I2C1 /GPIO
40	PI4	GPIO
41	PI5	GPIO
42	PI6	GPIO
43	PI7	GPIO
44	PF9	GPIO
45	PA0	GPIO
46	PA1	GPIO
47	PA2	GPIO
48	PA3	GPIO

2. GETTING STARTED

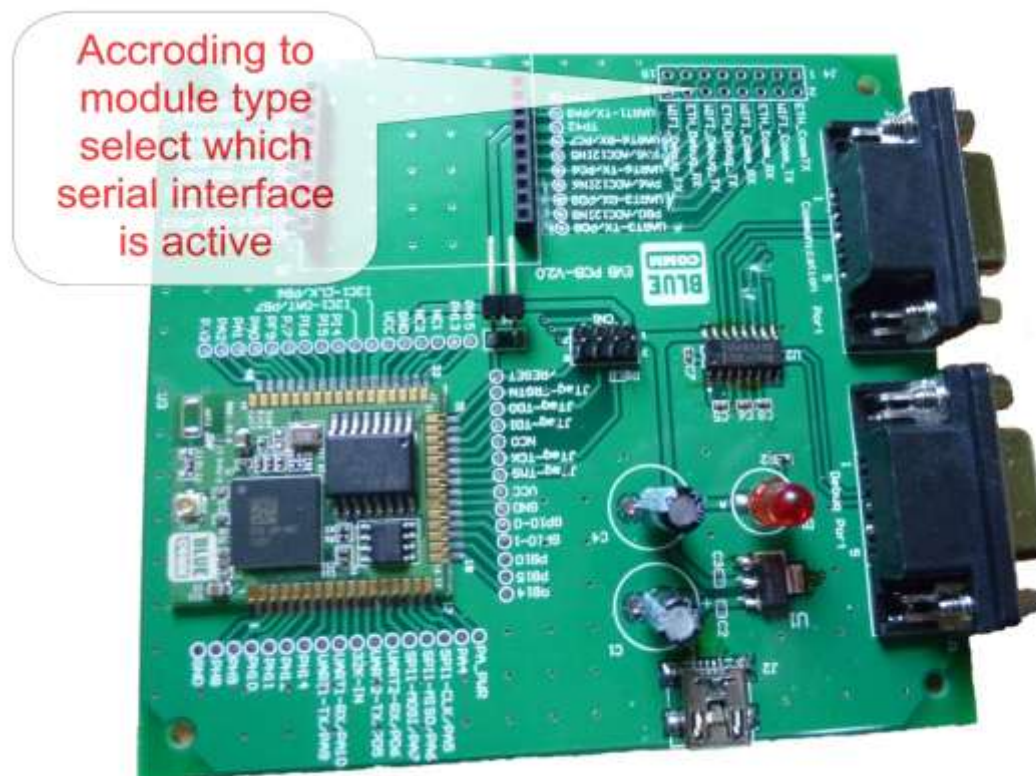
2.1 INSTALL THE W100 MODULE ONTO THE W100 EVALUATION BOARD

Before using the W100 evaluation board with the module, be sure to disconnect the power supply and serial device. Please refer to the figure below. When attaching the module to the evaluation board, make sure the module is securely installed on the evaluation board. After the module is installed, connect the power supply and serial device to the evaluation board.



2.2 SELECTING THE SERIAL INTERFACE

The W100 module uses a standard TTL serial signal input. However, to make evaluation more convenient, the evaluation board has built-in two RS-232 interfaces. Use a 16-pin jumper to select which serial interface is active.



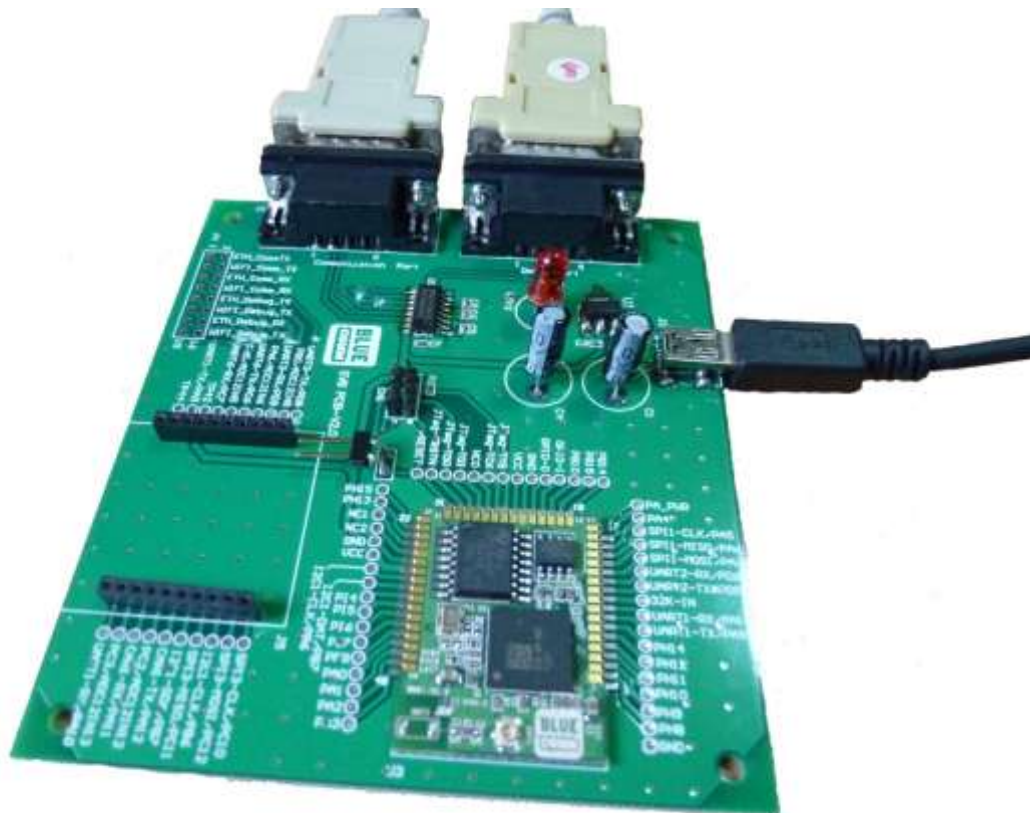
2.3 CONNECTING THE POWER

Connect the 5 VDC power line with the evaluation boards USB mini jack. If the power is properly supplied, the power LED on the evaluation board (D1) will show a red color until the system is ready.



2.4 CONNECTING TO A SERIAL DEVICE

To connect to a serial device for testing and development purposes, the module should be installed on the evaluation board. Be sure to select the serial interface you would like to use before you connect the evaluation board to the serial device. (Refer to the Selecting the Serial Interface section above when you are using jumper blocks to select the serial interface on the evaluation board.) The module's serial signals are routed to and from the RS-232 COM port on the evaluation board. Use a serial data cable to connect the serial device to the COM port on the evaluation board.



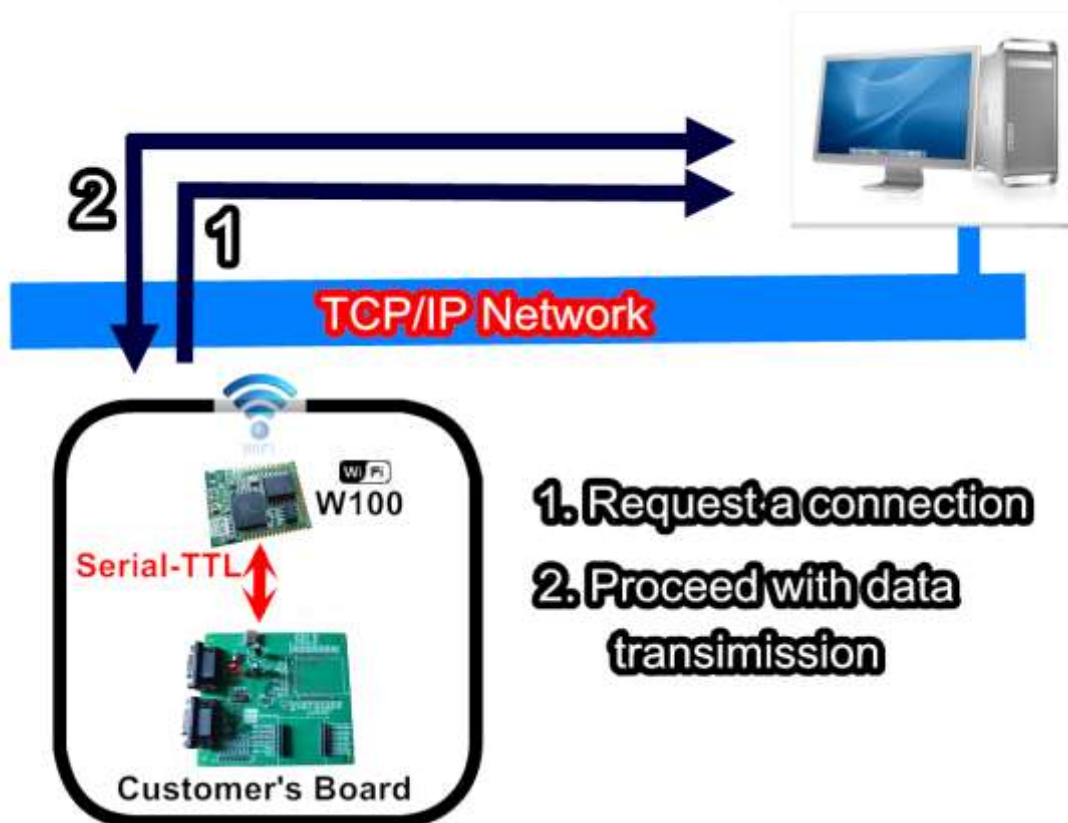
3. CHOOSING THE PROPER OPERATION MODE

The following topics are covered in this chapter:

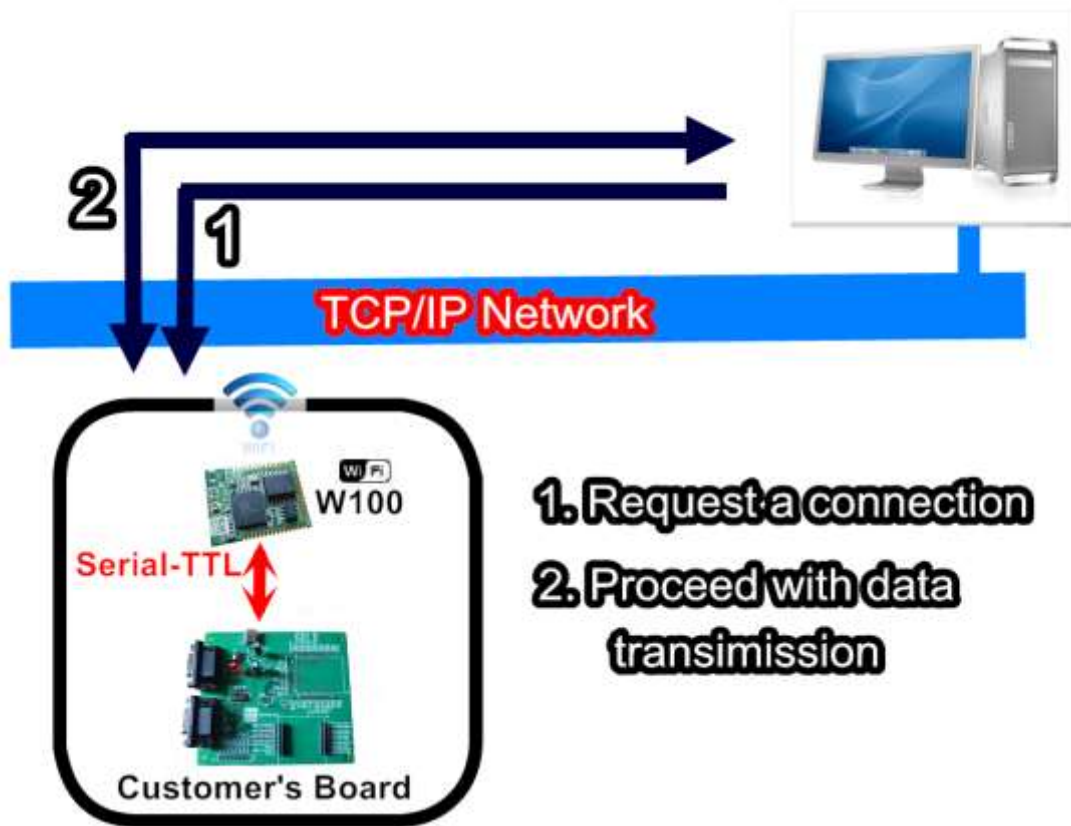
- TCP Client Mode
- MODBUS Gateway Mode

3.1 TCP CLIENT MODE

3.1.1 Using easy AT Command



3.2 MODBUS GATEWAY MODE



3.3 UDP MODE *OPTION

3.4 TCP SERVER MODE *OPTION



4. CHOOSING THE PROPER OPERATION MODE

The W100 supports several tools for configuring the module. In this chapter we briefly describe the options available and appropriate situations for using those options.

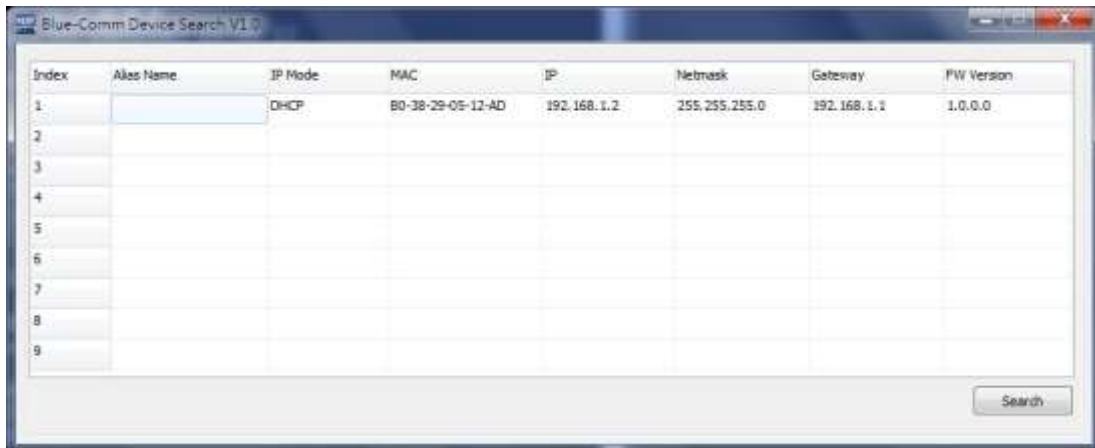
The following topics are covered in this chapter:

- Utility console
- Web console



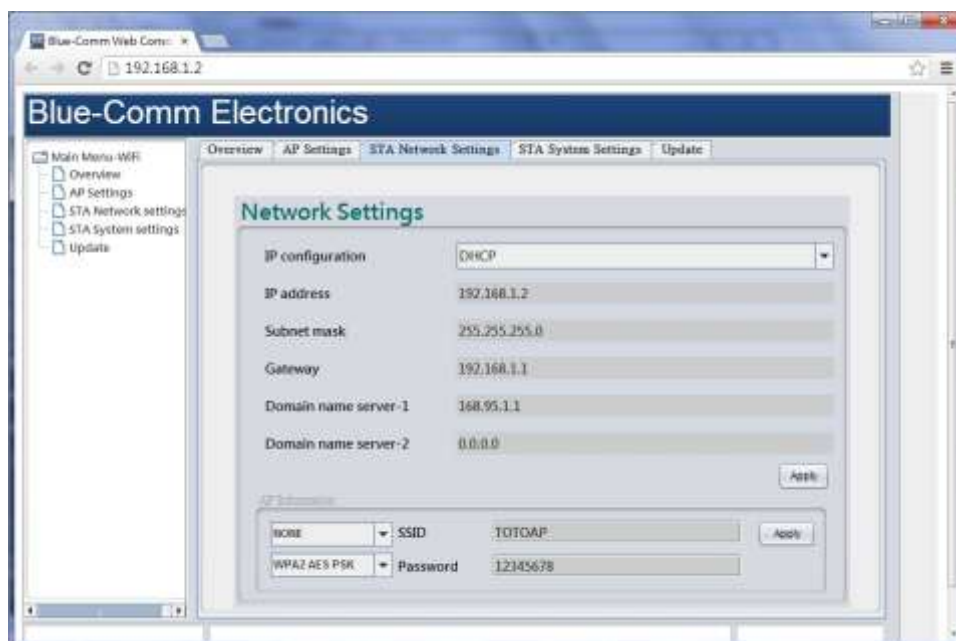
4.1 UTILITY CONSOLE

Device Search Utility is designed for Windows and is mainly used to search for the W100 modules and for assigning IP addresses.



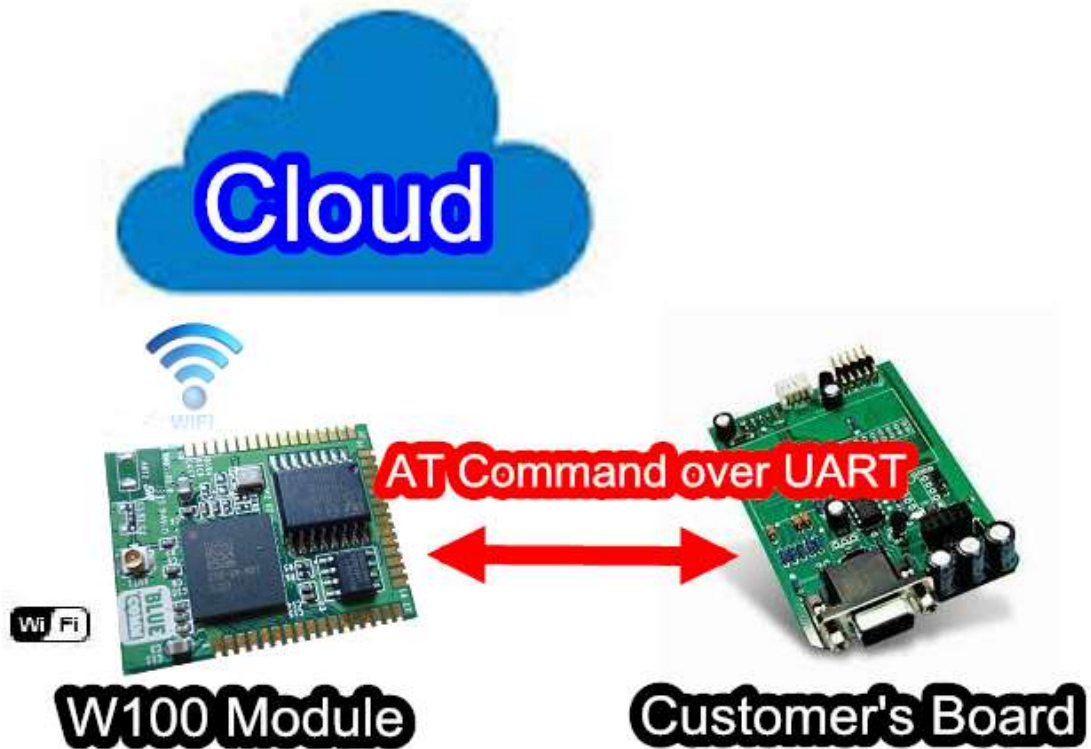
4.2 WEB CONSOLE

After locating a W100 with Device Search Utility, you may configure the W100 using a standard web browser.



5. AT COMMAND SET GUIDE

The W100 supports EZ-AT Command for configuring the module. In order to communication each other between W100 and customer's board, we must use AT Commands. Figure 1.1 illustrates the interface.





5.1 AT COMMAND SET

After locating a W100 with Device Search Utility, you may configure the W100 using a standard web browser.

Command	Response	Description
AT	OK	UART communication test
	Illegal Command	
	ERROR	

Command	Response	Description
AT+RESET	OK	System reset
	Illegal Command	
	ERROR	

Command	Response	Description
AT+VER	BIOS V1.0.0.0 BIOS 20131105163020 FW V1.0.0.0 FW B20131105163000 OK	Read version and build date



Command	Response	Description
AT+DEFAULT	OK	System reset to default , and reset right now
	Illegal Command	
	ERROR	

Command	Response	Description
AT+ECHO=1	OK	W100 echoes characters during command state.
	ERROR	
AT+ECHO=0	OK	W100 does not echo characters during command state.
	ERROR	

Command	Response	Description
AT+GET_JOIN_STATUS	ASSOCIATED	Associated
	OK	
	ASSOCIATING	Associating
	OK	
	ASSOCIATE FAILED	Associate faile
	OK	Illegal command format
	ERROR	
AT+SET_JOIN_PROFILE=	OK	Join AP Profile



AP_Name,Password,n n={0,1,2,3,4}	ERROR	*n =0: OPEN *n =1: WEP PSK *n =2: WPA TKIP PSK *n =3: WPA2 AES PSK *n =4: WPA2 MIXED PSK
---	-------	--

Command	Response	Description
AT+SCAN_AP	OK	Search for an access point
	ERROR	

Command	Response	Description
AT+REPORT_AP_INFO	1-2,AP1,Ch,Security,RSSI 2-2,AP2,Ch,Security,RSSI	Report access point information
	ERROR	

Command	Response	Description
AT+GET_DNS1	168.95.1.1	Read DNS-1 IP address
	OK	
AT+SET_DNS1=16 8.95.1.1	OK	Write DNS-1 IP address
	ERROR	



Command	Response	Description
AT+GET_DNS2	168.95.1.1 OK	Read DNS-2 IP address
AT+SET_DNS2=16 8.95.1.1	OK ERROR	Write DNS-2 IP address

Command	Response	Description
AT+GET_DNS2	168.95.1.1 OK	Read DNS-2 IP address
AT+SET_DNS2=168. 95.1.1	OK ERROR	Write DNS-2 IP address

Command	Response	Description
AT+GET_NETMASK	255.255.255.0 OK	Read subnet mask address
AT+SET_NETMASK= 255.255.255.0	OK ERROR	Write subnet mask address



Command	Response	Description
AT+GET_GATEWA Y	192.168.1.254 OK	Read gateway address
AT+SET_GATEWA Y=192.168.1.254	OK ERROR	Write gateway address

Command	Response	Description
AT+GET_TCP_PR OFILE=x * x={0, 1}	x, 192.168.1.100:1234 OK ERROR	Read Server IP and Port * x: TCP connection index
AT+SET_TCP_PRO FILE=x, 192.168.1. 100:502 * x={0, 1}	OK ERROR	Write Server IP and Port * x: TCP connection index

Command	Response	Description
AT+SET_TCP_CON NECT=x,y * x={0, 1} * y={0, 1}	OK ERROR	When y =1 Turn on x TCP connection index When y=0 turn off x TCP connection index * x: TCP connection index * y=1 connect ,y=0 disconnect



Command	Response	Description
AT+GET_TCP_STATUS= * x ={0 , 1}	Connected	Read TCP connection status
	OK	
	Disconnect	
	OK	
	ERROR	

Command	Response	Description
AT+GET_TCP_DATA= * x ={0 , 1}	TCP READ:x,0	Read TCP data length =0
	TCP READ:x,5,1122334455	Read TCP data length =5 ,Data ={0x11 0x22 0x33 0x44 0x55}
	ERROR	Syntax format error
AT+SET_TCP_DATA=,3,ABCD EF * x ={0 , 1}	OK	Write TCP data length=3, Datt={0xAB 0xCD 0xEF}

5.2 AT COMMAND EX1.

Step1. Select AT Command mode



Step2. Open a Hyper Terminal



```
COM2115200aud - Tera Term VT
File Edit Setup Control Window Help

AT Command Ready
AT+SET_JOIN_PROFILE=TOTOAP,77587758,3
OK
AT+GET_JOIN_STATUS
ASSOCIATED
OK
AT+SET_TCP_PROFILE=0,192.168.1.3:2000
OK
at+set_tcp_connect=0,1
OK
at+set_tcp_data=0,5,1234567890
OK
at+get_tcp_data=0
TCP READ:0,6,124578
at+get_tcp_data=0
TCP READ:0,10,1234567890
at+get_tcp_data=0
TCP READ:0,0
```

Join a AP

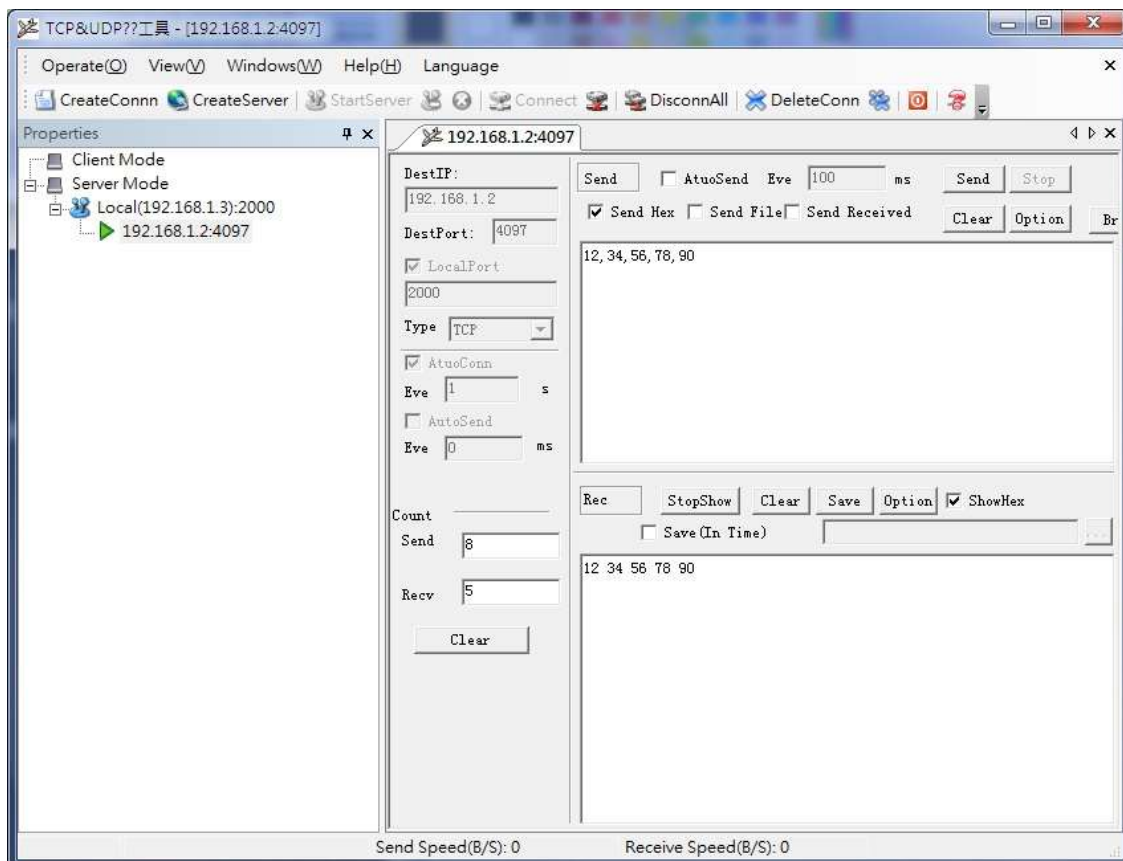
Read AP join status

Server IP address
192.168.1.3:2000

Connect to profile
index 0

Send data ,Profile index =0,
Data len =5, Data =0x01234567890

Read profile index 0





6. TECHNICAL SUPPORT CONTACT

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APPENDIX A. WELL KNOW PORT NUMBERS

This appendix is included for your reference. Listed below are port numbers that already have a well-established use. These port numbers should be avoided when assigning a port number to your E100 module.

TCP Socket	Application Service
0	reserved
20	FTP data
21	FTP control
25	SMTP
37	Time server
53	DNS
80	HTTP
502	MODBUS server

UDP Socket	Application Service
0	reserved
53	DNS



69	TFTP
161	SNMP
162	SNMP traps
9000	Device Search
9001	Device Report